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Effectiveness of a Community-Based Peer Caregiver Model on Caregiver Readiness for Fall Risk Prevention among Older Adults: A Quasi-Experimental Study in Banda Aceh, Indonesia

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ABSTRACT

Caregivers play an important role in preventing falls among older adults, particularly in community and home-based care settings. However, caregiver readiness to identify and manage fall risks remains a challenge, while evidence on peer-based caregiver interventions is limited. This study aimed to analyse the effectiveness of a Community-Based Peer Caregiver Model in improving caregiver readiness for fall risk prevention among older adults in Banda Aceh, Indonesia. A quasi-experimental pretest–posttest control group design was employed involving 211 caregivers from 11 community health centres in Banda Aceh. Participants were assigned to an intervention group (n=115), which received the Community-Based Peer Caregiver Model, and a control group (n=96), which received usual care. Caregiver readiness was assessed before and after the intervention using a structured questionnaire. Data were analysed using paired-samples and Welch's independent-samples t-tests, with Cohen's d used to estimate effect size. Caregiver readiness increased more substantially in the intervention group than in the control group. In the intervention group, the mean readiness score increased from 12.83±1.237 to 14.70±2.562 ($p<0.001$; Cohen's $d=0.75$). The posttest score was significantly higher in the intervention group than in the control group (14.70±2.562 vs. 13.71±1.698; $p=0.001$; Cohen's $d=0.45$). The between-group difference in mean change was 0.93 (95% confidence interval: 0.28–1.58; $p=0.005$; Cohen's $d=0.39$). The Community-Based Peer Caregiver Model was associated with a significantly greater improvement in caregiver readiness for fall risk prevention compared with usual care. Further longitudinal and randomised studies are recommended to confirm the sustainability and independent effects of the intervention.

Keywords: Caregiver readiness; Fall prevention; Older adults; Peer caregiver; Community-based intervention

INTRODUCTION

Ageing is a natural process characterized by progressive physical changes, declining physiological functions, and alterations in the functioning of various body systems and organs. The increasing number and proportion of older adults represent a growing public health challenge, including in Indonesia, as population aging has complex implications for health, social well-being, access to healthcare services, and social protection (Badan Pusat Statistik, 2020). This situation highlights the growing importance of strengthening healthcare and support systems for older adults, particularly in ensuring adequate care and assistance to maintain their health, safety, and quality of life.

One of the major health concerns among older adults is the risk of falls. Falls are multifactorial health problems associated with various factors, including declining physical function, impaired balance, muscle weakness, environmental hazards, and individual health conditions. A systematic review and meta-analysis demonstrated that fall risk among older populations is influenced by multiple individual and environmental factors, underscoring the need for comprehensive prevention strategies (Qian et al., 2022; Xu et al., 2022).

Supporting this concern, Iskandar et al. (2026) identified significant differences in fall-risk scores among 92 older adults from two communities in Aceh, highlighting the importance of early assessment to identify individuals at increased risk. Similarly, guidelines for fall prevention and management emphasize the importance of risk stratification and assessment, multifactorial interventions, physical exercise, environmental modification, and the involvement of multiple stakeholders (Montero-Odasso et al., 2022).

Falls affect not only the physical health of older adults but can also result in injuries, activity limitations, loss

of independence, and reduced quality of life. Evidence indicates that prevention strategies targeting modifiable risk factors, including home environmental hazards, can contribute to reducing falls among older adults, particularly those at higher risk (Hopewell et al., 2018). Therefore, fall prevention among community-dwelling older adults requires comprehensive approaches and active involvement from family members, caregivers, healthcare professionals, and the surrounding community to support daily activities and promote safety.

In home-based care settings, caregivers play a critical role in assisting older adults with daily activities, identifying risk factors, monitoring their health status, maintaining a safe environment, and implementing fall prevention measures. Caregiver involvement is particularly important because many fall prevention activities take place within the home and as part of everyday care. Research on informal caregiver involvement indicates that caregivers can contribute to adherence to preventive activities, identify and modify environmental risk factors, document fall events, and support behavioral changes related to older adults' safety (Sultana et al., 2023; Zhou et al., 2022).

However, fulfilling these responsibilities is not always straightforward. Caregivers may face various challenges in carrying out their roles, including the need for information, orientation, and guidance regarding caregiving responsibilities, access to resources, professional support, and social support (Hall et al., 2022). Furthermore, caregivers' experiences in managing fall risks may affect their physical, psychological, and social well-being. A qualitative review found that caregivers' concerns about the possibility of older adults experiencing falls can influence caregiving behaviors and create a need for adequate social and professional support (Ang et al., 2019; Shang et al., 2023).

These challenges highlight caregiver readiness as an important component of fall risk prevention among older adults. Readiness encompasses not only knowledge of fall risks but also the ability to identify risk factors, make appropriate decisions, implement preventive measures, utilize available resources, and sustain safe caregiving practices over time. Research on family caregivers has also shown that nursing interventions incorporating therapeutic relationships, family engagement, health education, multifactorial fall risk assessment, environmental modification, and care coordination can help empower caregivers to manage fall risks among older adults (Almeida et al., 2024; Lim & Gu, 2022).

Although various fall prevention interventions have been developed, their implementation remains challenging, particularly in translating prevention knowledge and recommendations into routine caregiving practices. A systematic review of the implementation of fall prevention interventions found that education and training were among the most commonly used implementation strategies; however, their effectiveness in real-world settings is influenced by contextual factors, stakeholder engagement, and intervention sustainability (Albasha et al., 2023). In addition, a review of fall prevention education demonstrated that educational interventions can improve awareness and knowledge of fall risks and promote preventive behaviors, but more integrated approaches are still needed (Hill et al., 2024; Ong et al., 2021).

These challenges highlight the need for a model that goes beyond education by strengthening caregiver readiness through learning, experience sharing, capacity building, and support for the implementation of fall prevention measures. A peer caregiver approach is particularly relevant because it positions caregivers as active participants in learning and caregiving capacity development. This approach is also consistent with caregivers' needs for information, role orientation, support, and access to resources that can enable them to provide care more effectively (Hall et al., 2022).

In Indonesia, these needs are becoming increasingly important as the older population continues to grow and family- and community-based care for older adults expands. Recent research in Indonesia indicates that family caregivers face various challenges when caring for older adults at risk of falls, including declining health among care recipients, hazardous home environments, sociocultural factors, and the need for prevention strategies that are appropriate to family and community contexts (Kurniawan et al., 2025; Mesbah et al., 2023; Zhou & Thakkar, 2024). These findings reinforce the importance of developing family- and community-oriented interventions to strengthen caregivers' capacity to prevent falls among older adults.

Despite growing evidence on caregiver education and fall-prevention support, an important gap remains in how to combine structured education with peer interaction, experience sharing, practical capacity building, and community-based support in a single caregiver-focused approach. Existing interventions commonly emphasize education or professional guidance, whereas less is known about whether a community-based peer model can strengthen caregivers' overall readiness to identify and manage fall risks in routine home care. The Community-Based Peer Caregiver Model was therefore developed as a multicomponent approach that integrates structured learning, peer exchange, practical support, and access to digital resources. This study aimed to examine whether participation in this model was associated with greater improvement in caregiver readiness for fall risk prevention among older adults than usual care in Banda Aceh, Indonesia.

METHODS

Research design

This study employed a non-randomized quasi-experimental pretest-posttest control-group design to examine whether the Community-Based Peer Caregiver Model was associated with improvement in caregiver readiness for fall risk prevention among older adults. The study included an intervention group and a control group. Caregiver readiness was assessed in both groups before the intervention (pretest) and after the intervention

(posttest) using the same instrument. Because allocation was not randomized, the findings are interpreted as unadjusted between-group associations rather than definitive causal effects.

Research location and time

The study was conducted at 11 community health centres (Puskesmas) in Banda Aceh, Aceh Province, Indonesia. The study targeted caregivers who provided care and assistance to older adults in their homes. Data collection was conducted over a three-month period, from August 21 to November 19, 2025, following approval from the relevant authorities. The study procedures included participant recruitment, baseline assessment (pretest), implementation of the Peer Caregiver Model in the intervention group, and post-intervention assessment (posttest).

Population and sample

The study population comprised 368 caregivers who provided home-based care for older adults and resided within the catchment areas of 11 community health centres in Banda Aceh. The original study protocol used Slovin's formula with a 5% margin of error, yielding a minimum sample of 192; this was increased by 10% to 211 to anticipate dropout or incomplete data. Participants were recruited using proportionate random sampling across the 11 community health centres. This sampling procedure concerned recruitment from the source population and should not be interpreted as random allocation to study groups. A power-based calculation using an expected between-group effect size, outcome variability, alpha level, and statistical power was not used; this is acknowledged as a methodological limitation of the study.

The inclusion criteria were caregivers who provided care for older adults aged ≥60 years with a risk of falls; were willing to participate and provide informed consent; had prior experience or skills in caring for older adults; and owned a smartphone capable of supporting the study application and connected to the internet. The exclusion criteria were caregivers who were ill or unable to perform their caregiving responsibilities during the study period and those who were not directly involved in caring for older adults at risk of falls.

Community-Based Peer Caregiver Model and comparison condition

Caregiver capacity strengthening was delivered with the involvement of the Public Health Division of the Banda Aceh City Health Office and home-care nurses. The initial training was conducted over two days and comprised four structured sessions. The training addressed: (1) knowledge and understanding of fall risk; (2) ability to manage fall risk; (3) implementation of fall-prevention measures; and, specifically for the intervention group, (4) the use of technology and a digital application for monitoring and screening fall risk among older adults.

Caregivers in the control group received the first three components (knowledge and understanding of fall risk, ability to manage fall risk, and implementation of fall-prevention measures) but did not receive the digital technology and application component. Caregivers in the intervention group received the same three components plus structured training in the use of digital technology and an application to support fall-risk monitoring and screening. Screening and monitoring activities performed through the application were recorded in its database, allowing the research team to review participants' use of the digital component during the follow-up period.

Following the two-day training, the intervention was monitored for three months. Ongoing follow-up and support were provided through a WhatsApp group and the digital application. These platforms were used to facilitate communication, reinforce the training content, support participants during implementation, and monitor the application-based fall-risk screening activities. Thus, the intervention consisted of an initial two-day, four-session capacity-strengthening programme followed by three months of technology-supported monitoring and follow-up.

Research variables

The primary outcome was caregiver readiness for fall risk prevention among older adults. Knowledge and understanding of fall risks, risk-management ability, implementation of fall-prevention measures, and technology use were treated as content domains contributing to the assessment of readiness rather than as separate independent variables in the primary effectiveness analysis. The exposure of interest was participation in the Community-Based Peer Caregiver Model (intervention versus control).

Research instruments

Caregiver readiness and related dimensions were assessed using a structured 25-item questionnaire developed for this study and organized into seven sections. The first section consisted of eight items assessing participants' general characteristics, including sex, age, educational attainment, relationship to the older adult, marital status, caregiving experience, income, and previous participation in specific training on fall-risk management among older adults. These items were used to describe the participants' characteristics and were not included as measurement indicators of caregiver readiness. The remaining sections assessed dimensions related to knowledge and understanding of fall risk, caregiver readiness and risk-management ability, implementation of fall-prevention measures, technology use, perceived impact on caregiver readiness, and participant suggestions and feedback.

The measurement items used three-category response options adapted to the content of each question. These included *understand–moderately understand–do not understand; ready–moderately ready–not ready; helpful–moderately helpful–not helpful; yes, completely–yes, partially–not at all; very often–sometimes–never;* and *easy–moderately easy–not easy*. Responses were directionally coded so that higher response categories consistently represented a more favourable condition in relation to the construct being assessed. Because the questionnaire comprised multiple conceptually distinct domains, the measurement properties were evaluated at

the construct level rather than treating all 25 items as a single unidimensional scale.

Content validity was assessed through expert review by two senior academics from Universitas Syiah Kuala, comprising a professor in nursing management and a professor in public health. Construct reliability and convergent validity were subsequently evaluated using Partial Least Squares Structural Equation Modeling (PLS-SEM) based on data from the 211 caregivers included in the main study. The final measurement model comprised five constructs. Knowledge and Understanding (PP1–PP3) showed outer loadings ranging from 0.667 to 0.856, Cronbach's alpha of 0.848, and an average variance extracted (AVE) of 0.649. Readiness and Ability (KK1–KK3) showed outer loadings of 0.762–0.866, Cronbach's alpha of 0.805, and an AVE of 0.676. Prevention Implementation (IP2–IP3) showed outer loadings of 0.714–0.918, Cronbach's alpha of 0.856, and an AVE of 0.665. Technology Use (PT1–PT3) showed outer loadings of 0.652–0.861, Cronbach's alpha of 0.818, and an AVE of 0.600. Impact on Caregiver Readiness (DK1–DK3) showed outer loadings of 0.803–0.809, Cronbach's alpha of 0.976, and an AVE of 0.569. No separate pilot sample was used; the measurement-model evaluation was conducted using the main study sample.

Data collection procedures

Before data collection, all participants were provided with an explanation of the study objectives, potential benefits, procedures, and their rights and responsibilities as research participants. After providing informed consent, participants in both the intervention and control groups completed a pretest to assess their baseline level of readiness for fall risk prevention among older adults.

Following the pretest, participants in both groups received caregiver capacity-strengthening activities addressing knowledge and understanding of fall risk, ability to manage fall risk, and implementation of fall-prevention measures. The intervention group additionally received training in the use of digital technology and an application for monitoring and screening fall risk among older adults. The initial training was conducted over two days in four structured sessions with the involvement of the Public Health Division of the Banda Aceh City Health Office and home-care nurses. Following the training, the effectiveness of the intervention was monitored for approximately three months through a WhatsApp group and the digital application, with application-based screening and monitoring activities recorded in the application database.

Data collection was conducted from August 21 to November 19, 2025. The pretest was administered before the intervention activities, and the posttest was conducted at the end of the approximately three-month observation period. The pretest–posttest assessment period was comparable between the intervention and control groups. Both groups completed the same questionnaire at pretest and posttest. The repeated administration of the same questionnaire may have introduced a testing or recall effect, which was considered when interpreting the findings. Completed questionnaires were checked for completeness before coding, data entry, cleaning, and statistical analysis.

Data analysis

Data were analysed using descriptive and inferential statistics. Descriptive analysis was used to summarise participants' characteristics and the distribution of caregiver readiness scores in the intervention and control groups using means, standard deviations, medians, minimum and maximum values, frequencies, and percentages, as appropriate for each type of variable.

Before inferential analysis, the distribution of caregiver readiness scores was assessed using the Kolmogorov–Smirnov test. The results indicated no statistically significant departure from normality for the control-group pretest ($p=0.241$), intervention-group pretest ($p=0.744$), control-group posttest ($p=0.328$), or intervention-group posttest ($p=0.754$). Accordingly, parametric statistical tests were used for the pretest–posttest analyses.

Within-group changes in caregiver readiness from pretest to posttest were analysed using paired-samples t-tests. The primary between-group comparison was based on the mean change score (posttest minus pretest), thereby comparing the magnitude of improvement between the intervention and control groups. Independent-samples t-tests were used for between-group comparisons, with Welch's correction applied when the assumption of homogeneity of variance was not met. Accordingly, Welch's t-test results were reported for comparisons in which unequal variances were identified.

Effect sizes were calculated using Cohen's d to quantify the magnitude of the observed differences, and a 95% confidence interval was reported for the between-group difference in mean change. Statistical significance was set at $p<0.05$. The reported analyses did not adjust for individual-level baseline covariates or account for potential clustering of participants within Puskesmas; these issues were therefore considered when interpreting the findings and are acknowledged as study limitations.

RESULTS AND DISCUSSION

Participant flow and baseline characteristics

A total of 211 caregivers were enrolled from 11 Puskesmas in Banda Aceh, comprising 115 participants from six Puskesmas in the intervention group and 96 participants from five Puskesmas in the control group. All enrolled participants completed the study and were included in the final analysis, with no post-enrolment exclusions, withdrawals, or losses to follow-up. Baseline characteristics assessed included age, educational attainment, relationship to the older adult, marital status, caregiving experience, monthly income, and previous participation in fall-risk management training. The distribution of these characteristics in the intervention and control groups is presented in Table 1.

Table 1. Baseline characteristics of participants in the control and intervention groups (n = 211)

Variable	Category	Control		Intervention	
		n	%	n	%
Age	< 25 years	3	3.1	4	3.5
	25-30 years	10	10.4	10	8.7
	31-35 years	15	15.6	15	13.0
	36-40 years	11	11.5	17	14.8
	41-45 years	27	28.1	19	16.5
	> 45 years	25	26.0	48	41.7
Education level	Elementary School	1	1.0	0	0.0
	Junior High School	4	4.2	7	6.1
	Senior High School	57	59.4	66	57.4
	Diploma/Bachelor	35	36.5	42	36.5
Relationship with older adult	Husband/Wife	9	9.4	19	16.5
	Child	55	57.3	58	50.4
	Close relative	15	15.6	29	25.2
	Home care	3	3.1	8	7.0
	Others	14	14.6	1	0.9
Marital Status	Unmarried	10	10.4	11	9.6
	Married	77	80.2	96	83.5
	Widow/Widower	9	9.4	8	7.0
Caregiving experience	< 1 year	18	18.8	17	14.8
	1 – 3 years	12	12.5	26	22.6
	> 5 years	16	16.7	33	28.7
	No previous experience	50	52.1	38	33.0
Monthly income	< IDR 1 million	63	65.6	39	33.9
	IDR 1 – 2 million	8	8.3	41	35.7
	IDR 2.1 - 3.5 million	21	21.9	19	16.5
	> IDR 3.5 million	22	22.9	16	13.9
Previous fall-risk training	Yes	1	1.0	2	1.7
	No	95	99.0	113	98.3

Characteristics of research variable values

Table 2 presents the Kolmogorov–Smirnov tests for pretest and posttest caregiver readiness scores. All reported p-values exceeded 0.05. These tests provide no evidence of marked departure from normality in the four measurement distributions; however, they do not by themselves establish normality of the change scores.

Table 2. Results of the normality test for caregiver readiness scores (n = 211)

No	Group and Measurement	p-value	Decision
1	Control – Pretest	0.241	Normally distributed
2	Intervention – Pretest	0.744	Normally distributed
3	Control – Posttest	0.328	Normally distributed
4	Intervention – Posttest	0.754	Normally distributed

Note: Normality was assessed using the Kolmogorov–Smirnov test. A p-value > 0.05 indicates that the data were normally distributed. Statistical significance was set at $p < 0.05$.

Posttest comparison between intervention and control groups

Posttest caregiver readiness was higher in the intervention group than in the control group (Table 3). The intervention-minus-control mean difference was 0.987 points. Welch's t-test indicated a statistically significant difference (t=3.345, df=199.30, p=0.001), with Cohen's d=0.45, indicating a modest standardized difference. This posttest comparison is supportive but secondary to the between-group comparison of change because the study used a non-randomized pretest-posttest design.

Table 3. Comparison of posttest caregiver readiness scores between the intervention and control groups (n = 211)

Group	n	Mean ± SD	Mean difference (intervention – control)	t	df	p-value	Cohen's *d*
Intervention	115	14.70 ± 2.562	0.987	3.345	199.30	0.001	0.45
Control	96	13.71 ± 1.698					

Note: Welch's independent-samples t-test was used because the equal-variance assumption was not met (Levene's test, p<0.001). The mean difference is calculated as intervention minus control. A p-value <0.05 was considered statistically significant. Cohen's d represents the standardized between-group effect size.

Change in caregiver readiness between groups

Caregiver readiness improved in both groups during the study period, with a larger mean increase in the intervention group (Table 4). The intervention group increased by 1.87 points and the control group by 0.94 points, yielding an intervention-minus-control difference in mean change of 0.93 points (95% CI 0.28-1.58; Welch t=2.827, df=207.24; p=0.005; Cohen's d=0.39). The confidence interval excludes zero, but the standardized effect was small to moderate. Because allocation was non-randomized, the difference should not be interpreted as eliminating confounding or secular influences.

Table 4. Comparison of changes in caregiver readiness between the intervention and control groups (n = 211)

Group	Δ Mean (posttest – pretest)	Between-group Δ difference (intervention – control)	95% CI	t	df	p-value	Cohen's *d*
Intervention	+1.87	0.93	0.28–1.58	2.827	207.24	0.005	0.39
Control	+0.94						

Note: Δ Mean is posttest minus pretest. The between-group difference is calculated as intervention minus control. Welch's independent-samples t-test was used. The main estimate was 0.93 points (95% CI 0.28-1.58). A p-value <0.05 was considered statistically significant; Cohen's d represents the standardized between-group effect size.

The principal finding was that caregivers receiving the Community-Based Peer Caregiver Model showed a greater increase in readiness than controls. The between-group difference in mean change was 0.93 points (95% CI 0.28-1.58; p=0.005), with a small-to-moderate standardized effect (Cohen's d=0.39). This result supports an association between participation in the model and greater improvement in caregiver readiness, while the non-randomized design precludes a definitive causal interpretation.

The finding is broadly consistent with previous caregiver-focused fall-prevention studies. Chutimarat and Konkam (2025) reported improvements in caregiver knowledge and preparedness following a fall-prevention preparation programme, while Wang et al. (2022) found that multimedia education combined with teach-back improved caregivers' knowledge, confidence, and preventive behaviours. Francis-Coad et al. (2023) likewise showed the feasibility of caregiver-involved, co-designed fall-prevention education. Together, these studies support

active caregiver engagement rather than information delivery alone.

The Community-Based Peer Caregiver Model combines structured learning with peer interaction, practical discussion, and digital resources. Peer exchange and experience sharing could plausibly help caregivers translate fall-prevention information into routine home-care practices. However, self-efficacy, problem-solving ability, social support, and experiential learning were not measured as independent mediators in this study. They should therefore be regarded as possible explanatory mechanisms rather than demonstrated pathways of effect.

The magnitude of the observed effect should also be interpreted carefully. Cohen's d=0.39 represents a small-to-moderate standardized effect rather than a large effect. Caregiver readiness is likely influenced by factors not fully captured in the unadjusted analysis, including caregiving experience, health literacy, family and socioeconomic circumstances, caregiving burden, exposure to other health information, and characteristics of the older adult. Several baseline characteristics differed between groups (Table 1), and these differences were not adjusted for in the analysis.

Importantly, the outcome was caregiver readiness, not fall incidence, fall-related injury, environmental hazards, or an objectively measured change in older adults' fall risk. The findings therefore do not demonstrate that the intervention reduced falls. Any potential effect on older-adult safety outcomes requires direct evaluation in future studies with longer follow-up and clinically relevant fall outcomes.

The model may have practical relevance for community nursing because caregivers are closely involved in daily home care. Nevertheless, recommendations for integration into Puskesmas or Posyandu Lansia should remain provisional until feasibility, staffing and training requirements, implementation costs, fidelity, scalability, and sustainability have been evaluated. The present study supports further implementation research rather than immediate assumptions of routine-service effectiveness.

This study has several limitations. The non-randomized allocation creates potential selection bias and residual confounding, and several baseline demographic and caregiving characteristics differed between groups (Table 1) without covariate adjustment. The follow-up period was short, the outcome was self-reported, and use of the same questionnaire at pretest and posttest may have introduced a testing effect. Possible contamination between groups and exposure to other fall-prevention information cannot be excluded. Participants were recruited from 11 Puskesmas, but clustering by health centre was not incorporated into the reported analysis. The study did not measure actual falls or fall-related injuries, and the findings may not generalize beyond caregivers in Banda Aceh. In addition, the original sample-size calculation was not power based, and the readiness instrument was newly developed and evaluated only within the main study sample.

Future studies should use randomized or carefully controlled allocation, power-based sample-size planning, baseline-adjusted analyses, longer follow-up, validated outcome measures, and direct assessment of falls and fall-related outcomes. Studies should also examine intervention fidelity and the individual contribution of peer interaction, education, and digital components.

CONCLUSION

Participation in the Community-Based Peer Caregiver Model was associated with greater improvement in caregiver readiness for fall risk prevention among older adults than usual care. The between-group change was statistically significant, but the standardized effect was small to moderate and should be interpreted in the context of the non-randomized design. These findings support the model as a promising community-based approach for strengthening caregiver readiness, while randomized studies with baseline adjustment, longer follow-up, validated measures, and direct fall outcomes are needed to establish causal effectiveness and sustainability.

In practice, the Community-Based Peer Caregiver Model may be considered for further feasibility and implementation evaluation within community health services, including Puskesmas and Posyandu Lansia. Before routine integration, future work should determine the resources, peer/facilitator training requirements, implementation costs, fidelity procedures, scalability, and sustainability of the model.

DECLARATIONS

Ethics Approval and Consent to Participate. This study was approved by the Health Research Ethics Committee of the Faculty of Medicine, Universitas Syiah Kuala (No. 182/EA/FK/2025, dated August 4, 2025). Permission to conduct the study was obtained from the Government of Banda Aceh (No. 070/765/Ba.Kesbangpol/2025, dated August 19, 2025). All respondents participated voluntarily after providing informed consent, and their confidentiality and anonymity were maintained throughout the study.

Availability of Data and Materials. The datasets generated and analysed during the current study are available from the corresponding author upon reasonable request.

Conflict of Interest. The authors declare no conflict of interest.

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Author Contributions. I: conceptualization, methodology, investigation, formal analysis, writing – original draft; EM: supervision, validation, writing – review and editing. Both authors approved the final manuscript.

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